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Traditional Ecological Knowledge: A Different Perspective on Environmental Health

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Many persistent health disparities exist between Native Americans and other racial groups in the United States.[1] As part of a broader effort to address these shortfalls and their root causes, the authors of a new commentary in *Environmental Health Perspectives* highlight the value of Traditional Ecological Knowledge (TEK) to Tribal epidemiology and medicine.[2] Although perspectives on health and disease often differ widely between Western scientists and Native American and Alaska Native cultures, the authors write, they also have many parallels and can complement one another.

TEK refers to knowledge of the relationships between people and the natural environment that has been passed down for thousands of years. The writers propose that acknowledging TEK as a legitimate school of thought would support a more complete understanding of environmental and social determinants of health among Native American populations. Applying TEK principles could help generate research questions, improve the interpretation and validation of study results, ensure equity and self-determination for Tribal nations that collaborate or participate in research, and potentially inform sustainable public-health interventions and initiatives.[2]

Ultimately, TEK offers a more holistic view of environmental health. To assess the impacts of the 2015 Gold King Mine spill in Silverton, Colorado, for example, a risk assessment by the U.S. Environmental Protection Agency (EPA) evaluated recreational contact with polluted water, while another funded by the National Institutes of Health (NIH) accounted for cultural, spiritual, and agricultural uses of the Animas and San Juan rivers by the Navajo Nation downstream of the spill.

The latter effort, developed in partnership with the Navajo beginning just days after the spill, is nearing completion and aims to present a comprehensive picture of health risks posed by the release, says principal investigator and University of Arizona professor Karletta Chief (Navajo). “We anticipate that there are many more exposure pathways that need to be considered when looking at this risk assessment,” she says. “That’s really based on the cultural values of the people, the spiritual connection to the places where they live, their deep connection to their land, and their livelihood.”

The key to employing TEK in Western science is placing both knowledge systems on equal footing, notes Symma Finn, a health scientist administrator at the National Institute of Environmental Health Sciences (NIEHS) and first author of the commentary. “Our concern is that when Western scientists consider Traditional Ecological Knowledge, they consider it something to incorporate or integrate. They want to subsume it into the Western perspective or fold it into our research paradigm,” she says. “[Instead,] we need to acknowledge that both systems have value.”

Triva Shirley replaces a dust collection filter in a high-volume particulate monitor installed near an abandoned uranium mine in the Navajo community of Blue Gap/Tachee. Community members shared their intimate knowledge of the mines and surrounding areas with researchers from the University of New Mexico METALS Superfund Research Program, and the researchers provided the technology to validate their information, analyze soil and water samples, and explore biological mechanisms underlying potential health effects. Their joint efforts have led to an exposure intervention that will be launched in 2018. Image: © Chris Shuey/UNM METALS Superfund Research Program.

Chief suggests going even further, by viewing indigenous knowledge as a foundation upon which reductionist or Western environmental health science can be built. Both Chief and Finn agree that the federal government has an important role to play, and the commentary emphasizes the responsibility of institutes and centers throughout the NIH, and programs such as its Native American Research Centers for Health,[3] to ensure recognition of TEK among researchers. The NIH, U.S. EPA, and National Oceanic and Atmospheric Administration[4] have funded projects that included TEK principles in addressing a variety of research topics, including chemical exposures, climate change, safety of traditional foods, childhood asthma, and the impacts of social stressors.

The new commentary is an outgrowth of a December 2015 workshop on embracing TEK within the environmental health sciences and biomedical research.[5] The participants included representatives of several federal entities—the NIEHS, the National Institute on Minority Health and Health Disparities (NIMHD), Indian Health Services (IHS), the Centers for Disease Control and Prevention, and the National Museum of Natural History at the Smithsonian Institution.

Coauthor and workshop panelist and moderator Mose Herne (Akwesasne Mohawk), who serves as chief executive officer of the IHS's Hopi Health Care Center in northeastern Arizona, calls TEK "more of a holistic approach, an all-things-are-connected approach." Although Herne himself holds a degree in environmental health, he says he advocates for researchers working with Tribal communities to "move beyond the dose–response relationships and specific health outcomes" and look at issues from a "systems" perspective.

"Environmental problems can have far-reaching results," Herne says. For instance, a tribe's contaminated fishing waters or polluted sacred site does not simply mean increased risk of disease from exposure to harmful substances. It can also disrupt cultural practices and lead to mental health and social problems, such as depression, suicide, violence, and other secondary effects with health implications of their own—implications that are rarely considered within Western environmental health research.

Coauthor Dorothy Castille, an investigator at the NIMHD, is particularly interested in how psychological responses to environmental disruptions—such as the loss of traditional food sources, ways of making a living, and language—may affect other kinds of responses as well. "There's a chain, a cascade of events that happens when one body system is out of sync," she says. "That cascade of events may create comorbid health outcomes."

This connection to the land and its attendant knowledge systems that make up what we now call TEK explains why environmental change and degradation reverberate so powerfully within Native American communities, says Johnnye Lewis, director of the NIH Center for Native American Environmental Health Equity Research. "That perspective is ingrained in land-based cultures and communities," she says. "When you have that link to the land, you do see the connection, because your survival depends on it."

This insight is well established among global health practitioners and researchers, adds Lewis, who was not associated with the commentary. But it is less common among biomedical and environmental health researchers.

Jennie Joe (Navajo), a professor emerita at the University of Arizona and former director of its Native American Research and Training Center, says the commentary should help increase awareness about the usefulness of TEK in scientific inquiry. "Hopefully," she says, "these types of ideas will eventually become part of the research toolkit for young scholars."

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